

RS53329 16V, 20A Buck Converter With Remote Sense

Features

High-Performance Power Conversion

- Wide 2.85V to 16V input voltage range
- 3.3V to 16V external bias supply
- 3.7V to 16V internal bias supply
- Up to 20A continuous output current
- Adjustable 0.6V to 5.5V output voltage for RS53329L
- Adjustable 0.9V to 5.5V output voltage for RS53329H
- $\pm 0.5\%$ output voltage regulation
- Differential remote voltage sensing

Advanced Control and Efficiency

- Robust Constant-On-Time control
- Pulse-skip and forced CCM operation
- Selectable 600kHz, 800kHz, 1MHz, and 2.1MHz switching frequencies
- Programmable soft-start
- Programmable switch-valley current limit

Low-Power Operation

- 90% maximum duty cycle
- 240 μ A no-load supply current
- 1.0 μ A shutdown current

Protection

- Non-latching overcurrent protection (OCP)
- Non-latching undervoltage protection (UVP)
- Undervoltage lockout (UVLO)
- Overtemperature protection (OTP)
- Latch-off overvoltage protection (OVP)

Compact Integration

- Compact 3mm $\times$ 4mm, 21-pin QFN package
- RoHS compliant and Green

Applications

- Server and Telecom Voltage Regulators
- Graphics Card Core Regulators
- Power Modules

Description

The RS53329 is a high-efficiency, synchronous step-down converter capable of delivering up to 20A of continuous output current from a 2.85V to 16V input supply. The device supports an adjustable output voltage from 0.6V to 5.5V, while the RS53329L supports an adjustable output voltage from 0.9V to 5.5V. An external bias supply can be used to improve conversion efficiency in high-current applications.

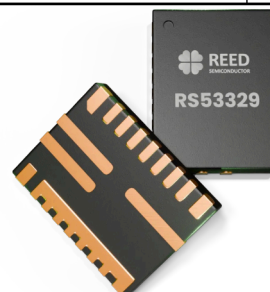
The RS53329 uses Robust Constant-On-Time control to provide fast transient response and stable operation across a wide range of input voltages, output voltages, and load conditions. Selectable 600kHz, 800kHz, 1MHz, and 2.1MHz switching frequencies allow designers to optimize efficiency, solution size, and transient performance. The device also supports pulse-skip and forced continuous-conduction modes (FCCM), enabling optimization of light-load efficiency or output ripple performance.

An integrated differential remote-sense amplifier provides accurate regulation directly at the load, helping compensate for voltage drops across PCB traces in high-current applications. The RS53329 provides $\pm 0.5\%$ output voltage regulation along with programmable soft-start and programmable switch-valley current limiting.

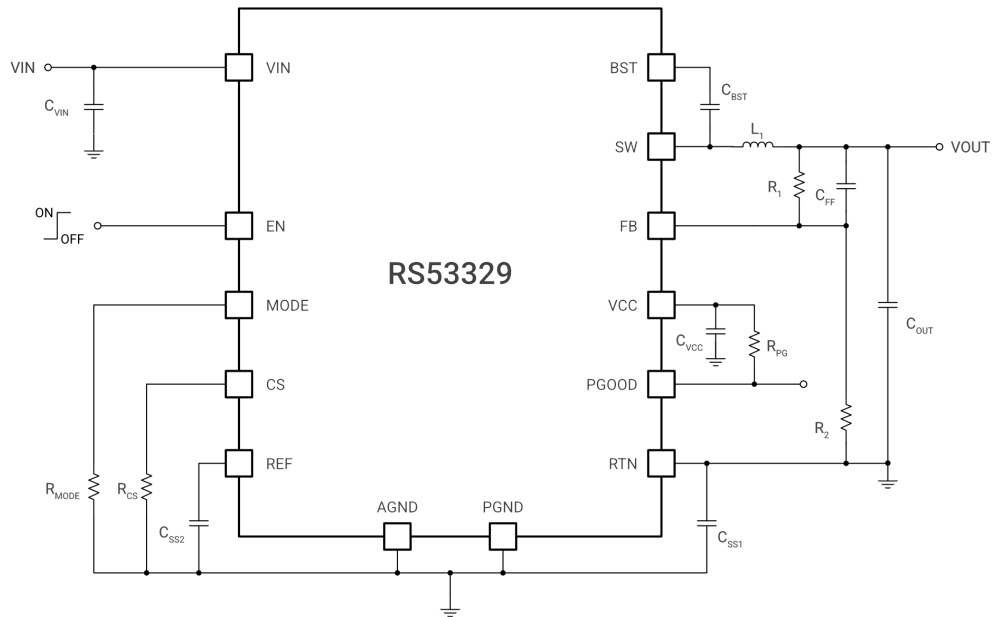
Comprehensive protection features include overcurrent protection (OCP), output undervoltage protection (UVP), output overvoltage protection (OVP), undervoltage lockout (UVLO), and overtemperature protection (OTP). The device also features low operating and shutdown current to minimize power consumption during light-load and standby operation.

The RS53329 is available in a compact 3mm $\times$ 4mm, 21-pin QFN package, providing a high-power-density solution for servers, networking equipment, storage systems, FPGA and ASIC power, industrial equipment, and other high-current point-of-load applications.

PART NUMBER	PACKAGE	SIZE
RS53329	QFN-21	3 $\times$ 4mm



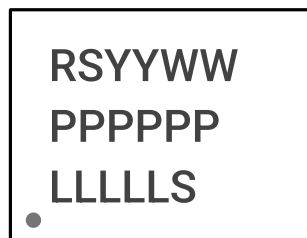
Typical Application Schematic



Ordering Information

PART NUMBER	VREF (V)	PACKAGE	SIZE	MSL RATING	SHIPPING METHOD	PACKAGE MARKING
RS53329LR	0.6	QFN-21	3 × 4	Level - 1	5000u Tape & Reel	R3319L
RS53329HR	0.9	QFN-21	3 × 4	Level - 1	5000u Tape & Reel	R3319L

Top Marking



Line 1

- RS: Prefix of Reed Semiconductor (RS is replaced by RE for engineering lots)
- YY: Year code
- WW: Week code

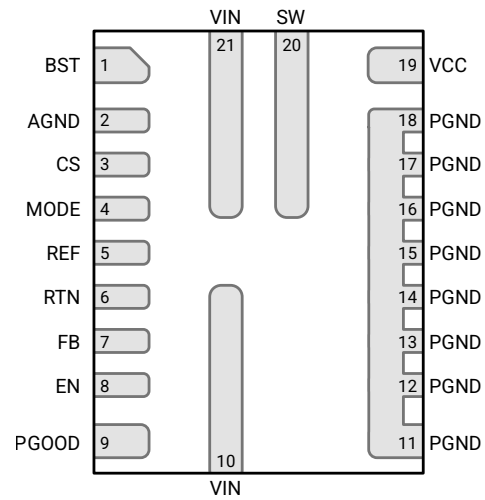
Line 2

- PPPPPP: Truncated part number

Line 3

- LLLLL: Lot code
- S: Assembly site code

Package Reference



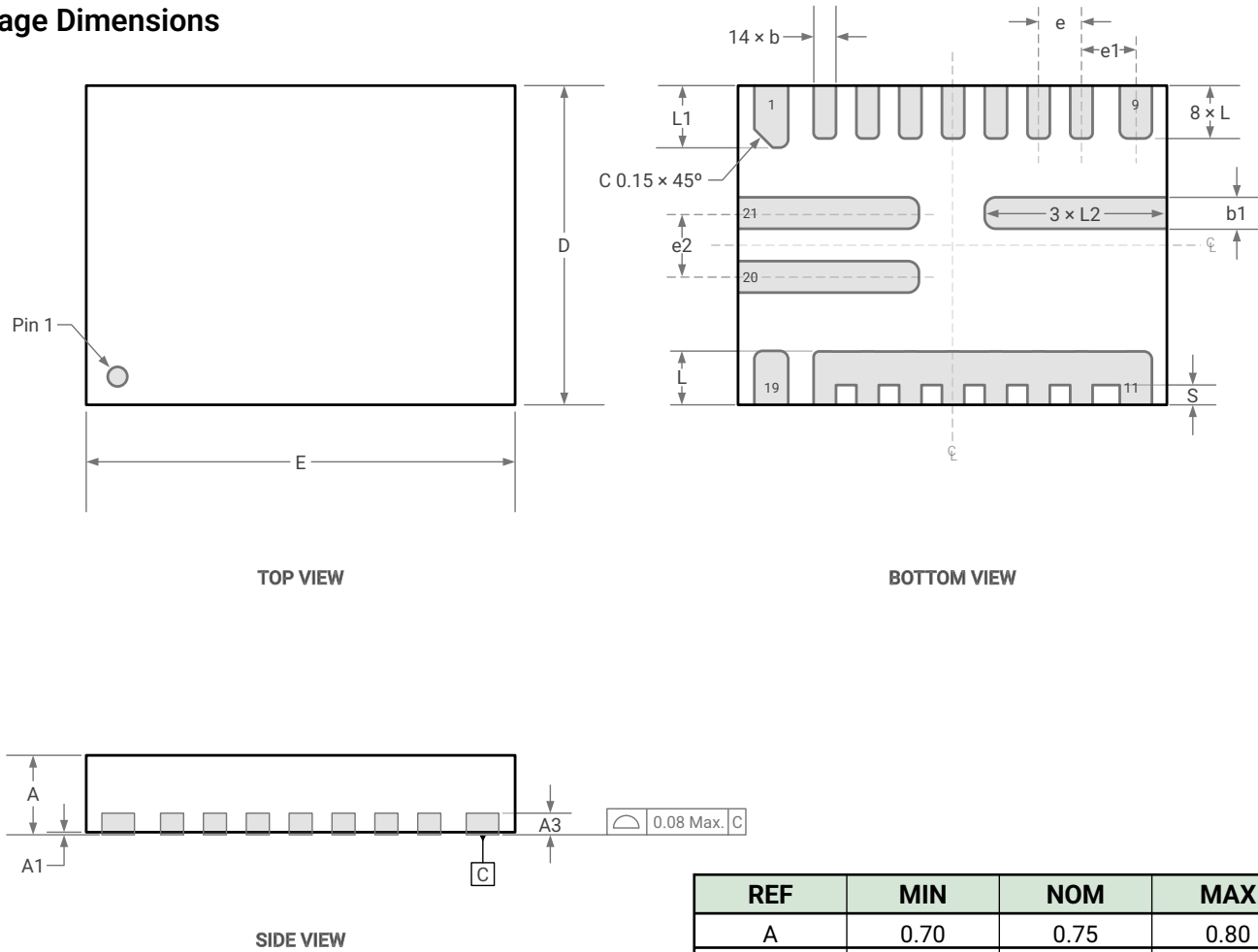
QFN-21 (3 × 4mm)

Pin Descriptions

PIN	NAME	TYPE	DESCRIPTION
1	BST	I	Bootstrap supply. Connect a 0.1 μ F to 1 μ F capacitor between BST and SW to provide the floating supply for the high-side gate driver.
2	AGND	G	Analog ground. Connect to PGND using a Kelvin connection.
3	CS	I	Current-limit setting. Connect a resistor to AGND to set the inductor valley-current limit trip point.
4	MODE	I	Operating-mode selection. Connect a resistor to AGND to select the switching frequency and DCM/FCCM operation.
5	REF	I	Soft-start setting. Connect a capacitor to PGND to set the soft-start time.
6	RTN	I	Remote-sense return. Connect to the output ground at the load.
7	FB	I	Remote-sense feedback. Connect the midpoint of the output-voltage resistor divider to FB. Connect the divider between the output and AGND, and place it close to FB.
8	EN	I	Enable input. Drive high to enable the internal VCC LDO and initiate soft start. Do not leave EN floating.
9	PGOOD	O	Power-good output. Open-drain output; requires an external pullup resistor.
10, 21	VIN	P	Power input. Supplies the power stage and internal LDO. Place the input bypass capacitors close to the VIN and PGND pins.
11 – 18	PGND	G	Power ground. Ground return for the power stage.
19	VCC	P	Internal LDO output. Connect a 1 μ F or larger bypass capacitor from VCC to PGND and place it close to the VCC pin.
20	SW	P	Switching node. Connect to the inductor using a short, wide copper path.

Type: I = Input, O = Output, I/O = Bidirectional, P = Power, G = Ground, – = No Connect.

Package Dimensions



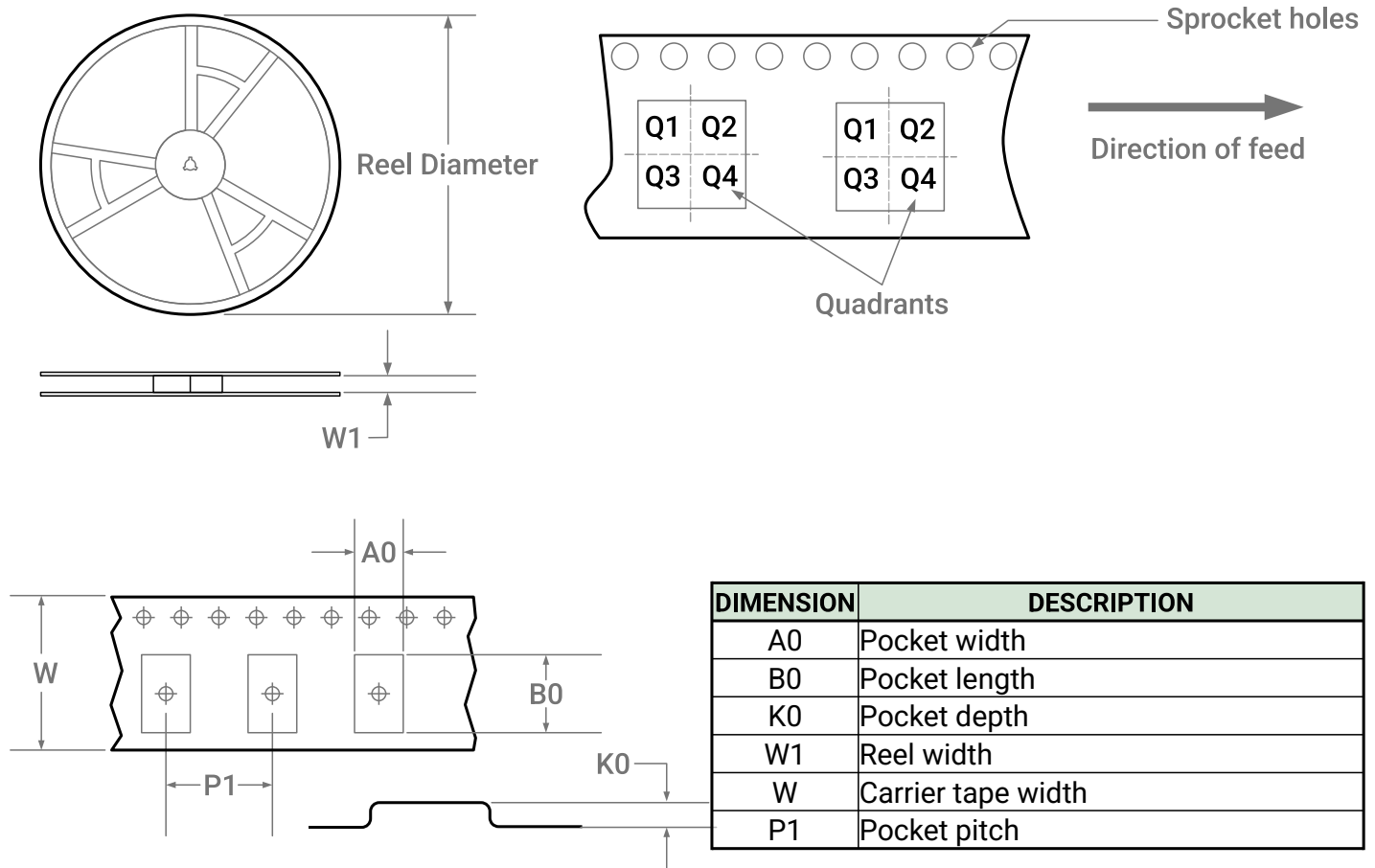
Notes

1. All dimensions are in millimeters.
2. Dimension b applies to the metallized terminal and shall be measured 0.15mm to 0.30mm from the terminal tip, excluding any optional terminal radius.
3. The bilateral coplanarity zone applies to both the exposed heat-sink slug and the terminals.

REF	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A3	0.203 Ref.		
b	0.15	0.20	0.25
b1	0.25	0.30	0.35
D	2.90	3.00	3.10
E	3.90	4.00	4.10
e	0.40 BSC		
e1	0.50 BSC		
e2	0.60 BSC		
L	0.45	0.50	0.55
L1	0.55	0.60	0.65
L2	1.65	1.70	1.75
S	0.15 Ref.		

1. All dimensions are in millimeters
2. All measurements are nominal
3. Drawing is not to scale

Tape and Reel Information

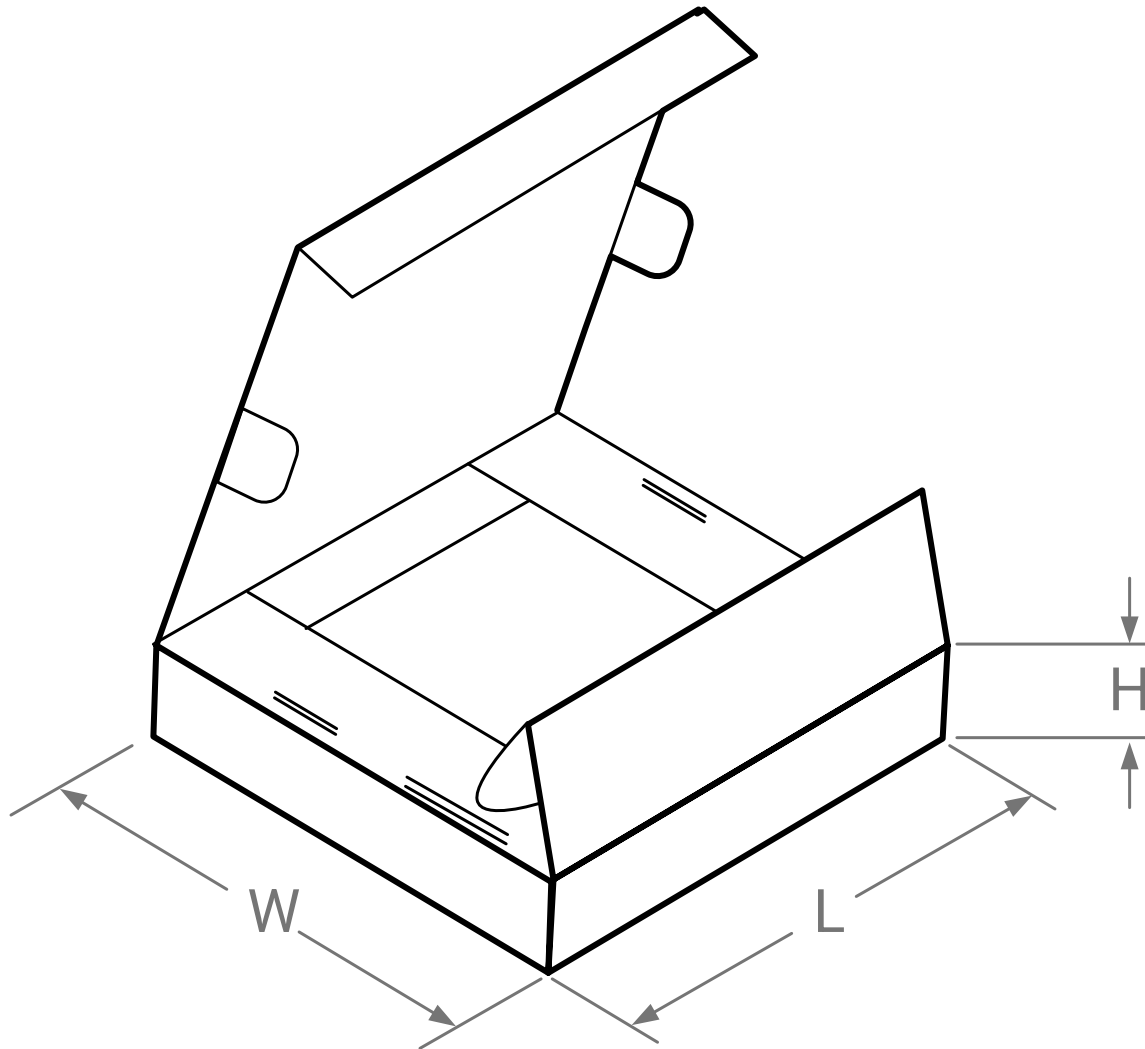


PACKAGE SIZE	REEL DIAMETER	W1	A0	B0	K0	P1	W	QUADRANT
3 × 4	330	12.8	3.4	4.4	1.10	8.00	12.0	Q1

Note:

1. All dimensions are nominal
2. All dimensions are in millimeters (mm)

Pizza Box Dimensions



PACKAGE SIZE	UNITS / BOX	LENGTH	WIDTH	HEIGHT
3 × 4	5000	355	340	50

Notes:

1. All measurements are in millimeters;
2. All measurements are nominal.